Long Term Value of 3-D Bioabsorbable Tissue Marker on Radiation Planning & Targeting, Cosmesis and Follow-up Imaging

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Abstract:

Background/Objective: Early breast cancer is most often treated with breast conservation lumpectomy followed by radiation therapy. With long term survival, desired outcomes include both cancer survival and optimal cosmetic results. Despite oncoplastic surgery and focused radiation techniques, some patients will be left with less than optimal cosmetic results. Accurate radiation targeting may decrease the overall volume of breast tissue treated, helping to decrease the negative cosmetic effects of radiation. We used a 3-D bioabsorbable marker (3DM) to aid in radiation targeting and have followed the long term results on cosmetic outcome and follow-up imaging.

Methods: Between May 2014 and September 2016 we implanted a 3DM in 79 (now 117) patients at lumpectomy for breast cancer often combined with oncoplastic reconstruction (reconstructive lumpectomy). Radiation Oncologists assessed impact on radiation planning & targeting. Of the entire group, 36 patients have been followed for at least one year with serial exams, follow-up mammograms, and assessment of cosmesis by clinician and patients.

Results: All 79 patients were evaluated for use of the 3DM. There were no cancer recurrences nor problems with the 3DM requiring removal in any patient. Overall, radiation oncologists felt the 3DM was useful for treatment planning in 85% of patients. Figure one demonstrates the value in planning and targeting by radiation oncologists. Use of 3DM targeting for boost or partial breast irradiation occurred in 69%. The 3DM allowed more exact targeting in patients receiving boost or partial breast radiation, allowing treatment volumes to decrease by an average of 24% in partial radiation patients. Of the 36 patients that have completed at least 1 year follow-up, cosmesis was rated as excellent/good by clinicians (96%) and patients (96%), and 100% excellent/good by 20 patients at 2 years. Mammograms taken at one year revealed minimal increase in fibrotic density in the area of the 3DM when compared with the similar area on the opposite breast.

Conclusions: Use of a 3-dimensional bioabsorbable marker (3DM) positively contributes to radiation treatment planning and targeting. This is followed by long term excellent/good cosmetic results with minimal changes on mammograms. Use of this 3DM is associated with a positive long term effect on breast cancer patients receiving breast conserving surgery. An ongoing registry study using 3DM may verify these findings in multiple centers.